



Quantifying the health impacts of future changes in temperature in California

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Abstract:

BACKGROUND: Several epidemiological studies demonstrate associations between high summer temperatures and increased mortality. However, the quantitative implications of projected future increases in temperature have not been well characterized. **OBJECTIVE:** This study quantifies the effects of projected future temperatures on both mortality and morbidity in California, including the potential effects of mitigation. **DATA and METHODS:** We first estimated the association between temperature and mortality for populations close to weather stations throughout the state. These dose-response estimates for mortality were then combined with local measures of current and projected changes in population, and projected changes in temperature, using a baseline of average temperatures from 1961 to 1990, for the years 2025 and 2050. The latter were based on two greenhouse gas emissions scenarios (A2 and B1) developed for the Intergovernmental Panel on Climate Change. In addition, we assessed the impacts of future adaptation through use of air conditioners. Several sensitivity analyses were conducted to determine the likely range of estimates. **RESULTS:** These analyses indicate that for the high emissions scenario, the central estimate of annual premature mortality ranges from 2100 to 4300 for the year 2025 and from 6700 to 11,300 for 2050. The highest estimates are from the models that use age-specific dose-response functions, while the low estimates are from the models that adjust for ozone. Estimates using the low emissions scenario are roughly half of these estimates. Mitigation based on our estimates of the effects of 10% and 20% increase in air conditioner use would generate reductions of 16% and 33% in the years 2025 and 2050, respectively. **CONCLUSION:** Our estimates suggest significant public health impacts associated with future projected increases in temperature.

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Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES)

Special Report on Emissions Scenarios (SRES) Scenario: SRES A2, SRES B1

Exposure :

weather or climate related pathway by which climate change affects health

Temperature

Climate Change and Human Health Literature Portal

Temperature: Extreme Heat

Geographic Feature: 

resource focuses on specific type of geography

Ocean/Coastal, Urban

Geographic Location: 

resource focuses on specific location

United States

Health Impact: 

specification of health effect or disease related to climate change exposure

Cardiovascular Effect, Morbidity/Mortality, Respiratory Effect

Cardiovascular Effect: Other Cardiovascular Effect

Cardiovascular Disease (other): cardiovascular mortality; cardiovascular hospitalizations

Respiratory Effect: Other Respiratory Effect

Respiratory Condition (other) : respiratory mortality; respiratory hospitalizations

Mitigation/Adaptation: 

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: 

type of model used or methodology development is a focus of resource

Exposure Change Prediction, Outcome Change Prediction

Population of Concern: A focus of content

Population of Concern: 

populations at particular risk or vulnerability to climate change impacts

Elderly

Resource Type: 

format or standard characteristic of resource

Research Article

Resilience: 

capacity of an individual, community, or institution to dynamically and effectively respond or adapt to shifting climate impact circumstances while continuing to function

A focus of content

Timescale: 



time period studied

Medium-Term (10-50 years)